

CLAIMS

1. Device for switching and controlling an electron dose emitted by a micro-emitter, characterized
5 in that it comprises:

- a sensor module (30) that receives the output current from the micro-emitter and a voltage to adjust the polarization point of the said device,
- 10 - a comparator module (31) that receives the output signal from the said sensor module, and a threshold voltage to adjust the quantity of electrons to be emitted,
- 15 - a logical module (32) that receives the output signal from the comparator module (31), and a start signal to initialize the electron emission, and a logical signal to define whether or not the micro-emitter should emit,
- 20 - a control module (33) that receives the output signal from the said logical module that generates the voltages necessary for initialization and extinction of the micro-emitter current pulse,
- 25 - means of varying the threshold voltage such that the sum $S = N_{\text{start}} + N_{\text{measure}} + N_{\text{off}}$ remains substantially constant during the electron emission, where N_{start} is the number of electrons at the current pulse start time, N_{measure} is the number of electrons at the measurement time of
30 this current pulse, and N_{off} is the number of

electrons at the extinguishing time of this current pulse.

2. Device according to claim 1, comprising means
5 of modulating the threshold voltage (V_2) in time starting from the initialization signal (start) so as to program an electron dose control that is variable in time such that excess electrons emitted during the start (t_{start}) and extinguishing (t_{off}) times are strictly
10 compensated by a reduction of the programmed dose in time.

3. Device according to either claim 1 or 2, comprising:

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- a module for detecting the micro-emitter current (67), capable of reproducing the tip current I_{tip} exactly, or adding a gain on the current,
 - a variable voltage generation module (68) that outputs a set voltage $V_2 = f(I_{\text{tip}})$.

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4. Linear or matrix switching and controlling device for electron doses emitted by a set of micro-emitters, characterized in that it comprises the following for each micro-emitter:

- 25
- a sensor module (30) that receives the output current from the micro-emitter and a voltage to adjust the polarization point,
 - a comparator module (31) that receives the output signal from the said sensor module and a
30 threshold voltage to adjust the quantity of electrons to be emitted,

- a logical module (32) that receives the output signal from the comparator module (31), and a start signal to initialize the electron emission, and a logical signal to define whether or not the micro-emitter should emit,
 - a control module (33) that receives the output signal from the said logical module that generates the voltages necessary for initialization and extinction of the micro-emitter current pulse,
 - means of varying the threshold voltage such that during the electron emission, the sum $S = N_{\text{start}} + N_{\text{measure}} + N_{\text{off}}$ remains substantially constant, where N_{start} is the number of electrons at the current pulse start time, N_{measure} is the number of electrons at the measurement time of this current pulse, N_{off} is the number of electrons at the extinguishing time of this current pulse.
5. Device according to any one of the above claims, in which each micro-emitter is a microtip.
6. Process for switching and controlling an electron dose emitted by a micro-emitter comprising:
- a step to convert the current output by the micro-emitter and to adjust the operating polarization point,
 - a step to compare the signal obtained at the output from the previous step with a threshold voltage for adjustment of the quantity of electrons to be emitted,

- a logical step to initialize the electron emission, and to define whether or not the micro-emitter should emit,
- a control step that generates the voltages necessary for initialization and for extinction of the micro-emitter current pulse,

characterized in that it comprises:

- a step to vary the threshold voltage (V_2) such that during the emission of electrons, the sum $S = N_{\text{start}} + N_{\text{measure}} + N_{\text{off}}$ remains approximately constant, N_{start} being the number of electrons at the current pulse start time, N_{measure} being the number of electrons at the measurement time of this current pulse, N_{off} being the number of electrons at the extinguishing time of this current pulse.

7. Process according to claim 6, comprising a step in which the threshold voltage (V_2) is modulated with time starting from the initialization signal (start) so as to program an electron dose control that is variable in time such that excess electrons emitted during the start (t_{start}) and extinguishing (t_{off}) times are all or partly compensated by a reduction of the programmed dose in time

8. Process according to claim 6, comprising:

- a step for detecting the tip current, capable of reproducing the tip current I_{tip} exactly, or adding a gain on the current,

- a step to generate a variable voltage (68) that outputs a set voltage $V2 = f(I_{tip})$.